

WHAT IS CLAIMED IS:

1. A process for the continuous production of polyurethane foam from at least one polyol component and at least one isocyanate component in the presence of water as a blowing agent and optionally further additives, comprising the steps of:
 - 5 metering into a mixing chamber of a mixing unit and mixing therein at pressures of from about 3 to about 200 bar to form a polyurethane reaction mixture, the at least one polyol component, the at least one isocyanate component, the water and optionally the further additives;
 - 10 generating bubble nuclei in the polyurethane reaction mixture by atomization thereof in a pressure-reduction body at pressures of from about 3 to about 200 bar, wherein the pressure is adjusted in the direction of flow downstream of the pressure-reduction body by a throttle body;
 - 15 causing the polyurethane reaction mixture containing bubble nuclei to flow out through the throttle body; and
 - 20 applying the polyurethane reaction mixture containing bubble nuclei to a substrate for foaming and curing.
2. The process according to claim 1, wherein the mixing in the mixing chamber is performed at pressures of from about 5 to 200 bar and wherein the atomization is performed at pressures of from 5 to 200 bar.
- 25 3. The process according to Claim 1, wherein the mixing unit is selected from the group consisting of stirrer-type mixers, static mixing elements and combinations thereof.
- 30 4. The process according to Claim 1, wherein the pressure-reduction body comprises one or more nozzles or orifices.

5. The process according to Claim 4, wherein the cross-sectional area of the one or more nozzles or orifices openings is adjustable.
6. The process according to Claim 1, wherein the throttle body comprises a diaphragm valve or pinch valve.
7. The process according to Claim 1, wherein the maximum pressure between the pressure-reduction body and the throttle body is about 20 bar.
- 10 8. The process according to Claim 1, wherein at least one bubble nucleating agent is dissolved in the polyol component and/or the isocyanate component in the mixing chamber before the mixing.
9. The process according to Claim 1, wherein at least one bubble nucleating agent is injected into the mixing chamber and is dissolved there.
- 15 10. In an apparatus for the continuous production of polyurethane foam, comprising a mixing unit having a mixing chamber and supply lines for the reaction components and a discharge opening for the polyurethane reaction mixture, the improvement comprising connecting a pressure-reduction body to the discharge opening and arranging an adjustable throttle body in the direction of flow downstream of the pressure-reduction body.
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